U.S. Fish and Wildlife Service
DESERT TORTOISE RECOVERY OFFICE
1340 Financial Blvd., Suite 234
Reno, Nevada 89502
Ph: 775-861-6300 ~ Fax: 775-861-6301

Desert Tortoise Science Advisory Committee Meeting
September 30 – October 1, 2005
Reno, NV

Meeting Goals and Objectives

- Finalize Ft. Irwin research priorities
- Finalize concept for threat categorization
- Identify recovery criteria

Attendees

Roy Averill-Murray, DTRO
Kim Field, DTRO
Peter Hudson, SAC
Sandy Marquez, DTRO
Earl McCoy, SAC
Katherine Ralls, SAC
Michael Reed, SAC
Amy Salveter, DTRO
Dick Tracy, SAC

Meeting Summary

1. Ft. Irwin Translocation Research Recommendations

The SAC described critical aspects that must be addressed in order to unambiguously evaluate the success, impacts, or effects of the translocation while contributing valuable information relevant to desert tortoise recovery. Detailed recommendations will be forwarded to the Ft. Irwin Conservation and Mitigation Work Group (CMWG). In summary:

Critical topics to compare between translocated, resident, and control individuals, generally listed from short-term to long-term, include:

- Movement patterns
- Dispersion/redistribution of individuals
- Condition/health of individuals
- Survival
- Recruitment

Research should focus on questions relevant to these topics. Proposals should include specific hypotheses that address questions such as:

- What habitat characteristics contribute to spatial patterns of movement, settlement, and survival of tortoises?
- What impacts (e.g., stress, behavior, disease) occur between experimental groups of tortoises?
- Does translocation change the demography of augmented populations?

Four different scales are important to the topics/questions listed above: individual, population, ecological, and landscape. Most of the essential variables that must be measured occur at the

individual scale, and these variables should contribute to simple descriptive statistics at larger scales.

Data must be collected on both the Southern Expansion Area (SEA) and the recipient sites, including measuring the variables at all 4 scales listed above, in order to establish the baseline conditions for the translocation. The fact that the SEA (and some recipient sites) will be completely cleared of tortoises also provides an important opportunity to characterize natural tortoise populations at an unprecedented spatial scale.

Those involved with the translocation project must recognize that the translocation "treatment" includes 4 effects: handling, introducing the translocated animals to unfamilar areas, increasing density, and time. The study design must control for each of these effects. Ideally, groups of tortoises from within the SEA would be translocated together to the different treatment sites.

In addition, diseased tortoises (ELISA positive and symptomatic) should not be overlooked after they are moved from the SEA into quarantine pens. ELISA-positive, asymptomatic tortoises should be segregated from symptomatic individuals. Important disease related topics include:

- Tracking the immune response over the course of the disease
- Investigate/document genetics of diseased tortoises relative to healthy tortoises (e.g., homozygosity)
- Test susceptibility ELISA-positive, asymptomatic tortoises (naturally recovered vs. treated with antibiotics) to reinfection

The CMWG should also consider using tortoises, including diseased tortoises, cleared from the SEA in a headstarting program to produce additional tortoises for research/recovery purposes in the western Mojave Desert.

Finally, researchers should record potentially confounding variables during the translocation experiment, including ecological and landscape effects. These data may also allow post-hoc analyses or inductive inferences of additional translocation-related questions, including those related to:

- effects of particular threats,
- effectiveness of management actions,
- possible Allee effects in low-density sites,
- relationship between high-density sites and habitat quality, and
- relationship of species/habitat models to putative barriers or corridors.

Action Item: Roy will draft the SAC recommendations and circulate for review prior to the next CMWG meeting.

2. Threat Assessment/Categorization during Regional Recovery Planning Workshops
After consideration of a new potential method to categorize threats for recovery planning, the SAC determined that there was simply too little information to conduct a meaningful categorization or prioritization of individual threats. In the meantime, regional recovery planning working groups should develop recovery action plans that address threats within their respective regions, especially those threats that contribute to a greater number of mortality mechanisms than others, as recommended in the Desert Tortoise Recovery Plan Assessment. Management should be implemented in a hypothesis-based approach.

An important task for the regional working groups should be to identify the relative strengths of relationships between potentially interacting threats. This could be done in a survey format in which respondents qualitatively ranked the degree to which individual threats contributed to another. For example, on a scale of 1-4, what is the relative contribution in a particular region of roads and highways to fires? What is the relative contribution of invasive plants to fires? Etc. This exercise will provide the basis for developing hypotheses to better predict the effects of management actions on recovery of the tortoise.

Action Item: The DTRO will draft a "threats interaction" survey and circulate for review.

3. Recovery Criteria

The SAC reviewed the current guidance on Recovery Goals, Objectives, and Criteria. The recovery goal for the desert tortoise is essentially to recover the species so that it may be delisted. Recovery objectives should outline the individual parameters necessary to recovery the tortoise, and recovery criteria should provide the values for those parameters. Recovery criteria must be objective and measurable and should address representation (conserving the breadth of the genetic makeup of the species to conserve its adaptive capabilities), resiliency (each population is sufficiently large to withstand stochastic events), and redundancy (a sufficient number of populations to provide a margin of safety for the species to withstand catastrophic events). Recovery criteria must also include the management or elimination of threats by specific mechanisms. In addition, recovery units will need to be reviewed and reassessed at some point in the future.

The SAC built off its brainstorming exercise from the last meeting to identify an initial recovery objective concept that should address some minimum tortoise distribution/protected habitat. This minimum distribution should be related to the area necessary to maintain a viable population. Potential recovery criteria to address this objective could take a tiered form, such as the following:

Recovery Objective (*concept*): Sufficient habitat is protected within each recovery unit to maintain some minimum distribution of tortoises.

Recovery Criteria (*concept*):

- 5 landscape areas (of some minimum size) are established within each recovery unit, and tortoises occupy 90% of the available habitat within those areas
  - 3 management areas are established within each landscape area, and tortoises occupy 95% of the available habitat within those areas
    - 1 intensive management area is established within each management area, tortoise density is maintained at least x/km^2

These recovery criteria address representation, resiliency, and redundancy. Managing for high resiliency (i.e., protecting against stochasticity) is particularly important. Specific recovery actions would identify different degrees of management within each tier. For example, the first tier might require relatively light management and would include the minimum occupancy criterion. The second tier would include moderate management, such as aggressive fire suppression, exotic plant removal, focused habitat restoration, etc., and would include a higher

occupancy criterion. The scale of the second tier should be sufficient to withstand the largest possible catastrophe that could reasonably be expected to impact a tortoise population.
The third tier would include more intensive management, such as headstarting (at least until threat mitigation was better understood), provision of supplemental water during drought, those actions in the second tier, and would include specific population density targets. Ideally, this tier would be managed at a level sufficient to produce excess tortoises to populate adjacent areas.

Additional discussion is needed to flush out these criteria and to identify additional criteria that more specifically address demographic parameters, survival, etc. This discussion should identify those population parameters necessary/possible to measure at each scale. In addition, the committee may ultimately want to define criteria under which it would be appropriate to uplist the tortoise to Endangered if warranted by continued negative trends.

Action Item: The DTRO will flush out the current recovery criteria concept prior to the next meeting.

Next Meetings
The next meeting is scheduled for **December 9-10 in Tucson**. The following meeting will be on **January 20-21 in Las Vegas**. Meeting format will be changed so that the first day begins after lunch, and the second day will be a full day. Also, the committee decided that the idea of holding a researchers' summary forum in conjunction with a SAC meeting would be relatively unproductive compared to other possible activities. Providing abstracts or summaries of ongoing research would provide the relevant information more efficiently, while still allowing follow-ups as necessary.

Action Item: Roy will circulate potential dates for a meeting in February/March in an attempt to schedule that meeting before calendars fill in.